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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,218	12/11/2003	Robert Zeller	126457.101	8004

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EXAMINER	
GREENE, JASON M	

ART UNIT	PAPER NUMBER
1724	

DATE MAILED: 04/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/733,218	ZELLER ET AL.	
	Examiner	Art Unit	
	Jason M. Greene	1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11,15-17, 19 and 21-28* is/are pending in the application.

4a) Of the above claim(s) *12-14,18 and 20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,15-17, 19 and 21-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 December 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/20/04; 2/18/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 12-14, 18 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10 February 2005.

Drawings

2. The drawings are objected to under 37 CFR 1.84(u)(2) because the view number for Fig. 6 is not larger than the numbers used for reference characters. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the

remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claims

3. With regard to claim 6, the Examiner suggests Applicants change the second occurrence of the word "is" in line 6 to the word "it" to correct an apparent typographical error.

4. With regard to claim 19, the Examiner suggests Applicants change the word "a" at the beginning of line 11 to the word "said" or the word "the" to clarify that the recited bed of material is the same bed of material recited in lines 4 and 8. The Examiner also suggests Applicants change the phrase "said second filter" in line 9 to read as "said second filter element" to clarify antecedent basis.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 2, 8 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 2, 8 and 11 recite the improper Markush group "wherein said sintered nanoparticle material is comprised of metals, metal alloys, and mixtures of these materials. However, since the phrase "comprised of" is open-ended, it is not clear whether or not the nanoparticle material can include materials other than those recited. For examination purposes, the Examiner has interpreted the limitation to mean that nanoparticle material includes only the recited materials. If this interpretation is correct, the Examiner suggests Applicants rewrite the limitation to read as "wherein said sintered nanoparticle material is selected from the group consisting of metals, metal alloys, and mixtures of these materials."

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 5-11, 21-25 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Jha et al.

With regard to claims 1-3, 7, 8, 10 and 11, Jha et al. discloses a filter element comprising a sintered porous composite material comprising a porous base material (the open-pore nickel foam) and a layer (14) of porous sintered nanoparticle material, said layer of porous sintered nanoparticle material on one or more surfaces and penetrating a portion of said porous base material to form a substantially continuous structure, said porous sintered nanoparticle material having interconnected pores smaller than the pores in said porous base material, wherein the sintered nanoparticle material comprises nickel in Fig. 1, col. 2, lines 49-56 and col. 3, line 63 to col. 4, line 22.

The Examiner notes that the term "nanoparticle" has been given its broadest interpretation consistent with the specification. Specifically, the term "nanoparticle" has been interpreted to mean that the particles have a diameter or a largest dimension of less than about 1000 nm, as taught in paragraph 0042 of the instant specification.

Jha et al. explicitly teaches the particles forming the sintered layer having a diameter of less than 1 μm (1000 nm) in col. 2, lines 55-56. Therefore, since Jha et al. explicitly discloses using nickel particles having an average size of less than 1000 nm, the claims are anticipated.

With regard to claim 5, since Jha et al. teaches the sintered porous composite filter element being sintered in a protective nitrogen atmosphere (see col. 7, lines 11-

16), the sintered porous composite filter element will comprise nitrogen gas in the pores of the material.

With regard to claims 6 and 9, Jha et al. discloses the sintered porous composite filter element further comprising a housing (212) wherein the sintered porous composite filter element is bonded (welded) to the housing, wherein said housing with the bonded sintered porous composite material is characterized in that it has a sieving LRV of at least 2 for 0.2 μm particles in a fluid in Fig. 2, col. 1, lines 17-18, col. 4, lines 23-41 and col. 9, line 1 to col. 10, line 28. Specifically, Jha et al. teaches the sintered porous composite filter elements having a sieving LRV of 9 to 9.95 for 0.1 μm particles (the most penetrating particle size) in col. 1, lines 17-18 and col. 9, line 1 to col. 10, line 28. Since the sieving LRV of a sintered porous composite filter element increases as the size of the particles in the fluid increases, the sintered porous composite filter elements inherently have a sieving LRV of at least 9 for 0.2 μm particles in a fluid.

With regard to claims 21, 22, and 28, Jha et al. discloses a filter element comprising a sintered porous composite material comprising a porous base material (the open-pore nickel foam) and a layer (14) of porous sintered nanoparticle (less than 1000 nm) material, said layer of porous sintered nanoparticle material on one or more surfaces and penetrating a portion of said porous base material, said porous sintered nanoparticle material having pores smaller than the pores in said porous base material, said porous composite filter element being characterized in that it has an LRV of at least

2 for a 0.2 μm particle in water in Fig. 1, col. 1, lines 17-18, col. 2, lines 49-56, col. 3, line 63 to col. 4, line 22, and col. 9, line 1 to col. 10, line 28. Specifically, as noted above, since Jha et al. teaches the sintered porous composite filter elements having a sieving LRV of 9 to 9.95 for 0.1 μm particles, the filter elements will inherently have an LRV of at least 9 for larger 0.2 μm particles.

With regard to claims 23 and 24, Jha et al. teaches the sintered porous composite filter elements having a sieving LRV of 9 to 9.95 for 0.1 μm particles in col. 1, lines 17-18 and col. 9, line 1 to col. 10, line 28.

While Jha et al. does not explicitly recite the LRV of the sintered porous composite filter elements for 0.05 μm particles, the filter element will inherently have an LRV of at least 4 for 0.05 μm particles due to the fine pore structure. Furthermore, since claims 23 and 24 are silent as to the specific flow rate at which the LRV is determined, the Examiner has assumed that the claims are intended to cover all flow rates up to a maximum flow rate at which the pressure drop across the filter element exceeds a predetermined operational limit. Accordingly, the claims are seen as encompassing very low flow rates at which the filter element will display higher LRVs. Therefore, the sintered porous composite filter element of Jha et al. inherently has an LRV of at least 4 for a 0.05 μm particle in water.

With regard to claim 25, Jha et al. discloses the sintered porous composite filter element having a flux of 13.4 slpm/in^2 (2.077 slpm/cm^2) at a pressure drop of 10.5 psi in

col. 10, lines 20-28. Therefore, the pressure coefficient can be calculated as 10.5 psi * (1 / 2.077 slpm/cm^2) = 5.06 psi cm^2/slpm, which is less than 250 psi cm^2/slpm. While Jha et al. is silent as to the specific gas used to determine the LRV, the sintered porous composite filter element will inherently exhibit approximately the same pressure coefficient regardless of the specific gas used, including nitrogen.

9. Claims 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Jha et al.

Jha et al. discloses a method for removing material from a fluid comprising flowing a fluid having said material therein through the sintered composite material of claim 1 wherein the sintered composite material removes said material from the fluid in Fig. 1, col. 2, lines 49-56, col. 3, line 63 to col. 4, line 22 and col. 9, lines 1-14.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jha et al. in view of Zeller.

Jha et al. does not disclose the sintered porous composite material including sintered dendritic nanoparticles.

Zeller discloses using dendritic particles to produce sintered porous composite filter elements in col. 5, lines 5-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the dendritic shape of Zeller into the particles of Jha et al. to provide filter elements having a higher pore area, as suggested by Zeller in col. 5, lines 5-12.

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jha et al. in view of Subramaniam et al.

Jha et al. teaches the method of claim 15 wherein the fluid is a gas or a liquid in col. 2, lines 32-36.

Jha et al. does not disclose the fluid being a supercritical fluid.

Subramaniam et al. discloses a similar method comprising passing a supercritical fluid through a porous filter to remove material from the supercritical fluid in col. 3, lines 7-59.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the supercritical fluid of Subramaniam et al. into the method of Jha et al. to provide a filtered supercritical fluid having 99.9999999% of particles larger than 0.1 μm removed, as suggested by Jha et al. in col. 1, lines 17-19 and col. 9, lines 1-14.

13. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegelman et al. in view of Jha et al.

Spiegelman et al. discloses an apparatus (10) for removing contaminants from a fluid stream comprising a housing (12) for containing a bed material (20), a second filter element (16) that is a sintered porous material having nanometer sized (0.1 μm or 100 nm) pores, said second filter element secured to an inlet end of the housing to permit fluid flow through the apparatus, the bed material, and the second filter element, said second filter element removing particles from the fluid stream, a bed of material (20) covering said second filter element and contained within said housing, said bed removing contaminants from said fluid stream, and a first filter element (18) secured to the housing that retains the bed material within the housing between the first filter element and the second filter element, said first filter element permitting fluid flow through the apparatus in Fig. 1 and col. 3, line 22 to col. 4, line 64.

Spiegelman et al. does not disclose the second filter element being a sintered porous composite material.

Jha et al. discloses a filter element comprising a sintered porous composite material comprising a porous base material (the open-pore nickel foam) and a layer (14) of porous sintered nanoparticle material in Fig. 1, col. 2, lines 49-56 and col. 3, line 63 to col. 4, line 22.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the sintered porous composite material of Jha et al.

into the second filter element of Spiegelman et al. to provide a filter element having increased mechanical strength and lower pressure drop, as suggested by Jha et al. in col. 2, lines 22-36.

14. Claim 26 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Jha et al.

While Jha et al. does not explicitly disclose the sintered composite filter element operating at a pressure differential across the material of greater than 50 psi, the filter element will inherently be able to withstand such a pressure drop since it is formed from sintered metallic particles bonded to a porous metallic base material.

Alternatively, one of ordinary skill in the art at the time the invention was made would have recognized that the filter element could have been designed to support pressure drops in excess of 60 psi since Jha et al. explicitly teaches producing the filter element to have high mechanical strength in col. 2, lines 22-36.

15. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jha et al.

Jha et al. teaches the thickness of the porous sintered nanoparticle material layer being 0.01 inch (254 microns) or less in col. 5, lines 38-40.

The Examiner notes that the prior art range of a thickness of 254 μm or less is seen as overlapping the claimed range of less than 100 μm. Therefore, a prima facie

case of obviousness exists which must be overcome through a showing of unexpected or unobvious results. See MPEP 2144.05.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Ettel et al., Motoki et al., Takahashi et al., Connolly et al., Satou et al., Verduijn et al., Kamijo et al., Neumann et al., Herrmann et al., JP 9-220423 and EP 0 808 655 A1 references discloses similar sintered porous composite filter element materials.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Greene whose telephone number is (571) 272-1157. The examiner can normally be reached on Monday - Friday (9:00 AM to 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Greene
Examiner
Art Unit 1724

4/27/05

jmg
April 27, 2005